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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,211	MORRILL ET AL.	
	Examiner	Art Unit	
	Erin Snelting	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11,12,14,15,27-32,37,38 and 64-69* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11,12,14,15,27-32,37,38 and 64-69* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement is made of Amendment received 05-11-2009. Claims 1-10, 16-26, 33-36, and 39-63 remain cancelled; Claim 13 is cancelled; Claims 11, 12, 14, 27, and 38 are amended; new claims 64-69 are presented for consideration.

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Terms “biased” and “bias” as in claim 31 do not appear in the specification, and thus their meaning is not apparent.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 27-32, 64, 65, 68, and 69 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 27 recites the limitation "the shape" in line 6. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 31 recites the limitation "the rod" in line 3. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 31 recites the limitation "the rod ends" in line 5. There is insufficient antecedent basis for this limitation in the claim.

7. Claim 32 recites the limitation "the rod ends" in line 1. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 64 recites the limitation "the melting chamber" in lines 2 and 3. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination, the limitation will be interpreted as "heating chamber", as in claim 11.

9. Claim 65 recites the limitation "the speed of feeding the rod" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. The term nearest possible antecedent in meaning is “a step of pushing a solid glass rod” in claim 11, line 5, but “pushing” does not necessitate feeding, or moving, or any speed of movement.

10. Claim 68 recites the limitation "the step of pushing a horizontal tube" in line 13. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination, the limitation will be read as “the step of pushing a horizontal solid glass rod”.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 12 and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by Sasaki '746 (US Patent No. 5,540,746).

13. Regarding claim 12, Sasaki '746 teaches:

a. providing a heating chamber (melting and injection portion 10, Figs. 1, 5)

b. the heating chamber having a single inlet (inlet 26 and heating cylinder 12, up to injection nozzle 14, Figs. 1 and 5) and a single outlet (injection nozzle 14, Figs. 1 and 5)

c. pushing a solid glass rod (glass rod 18, Figs. 1 and 5) into the inlet ("glass rod 18 is inserted into the heating cylinder 12 and pressed by the glass rod pressing device 16", column 3, lines 43-45)

d. the inlet comprises a heated cone forming a restriction having a diameter less than the diameter of the solid glass rod (see cone at end of heating cylinder 12 near injection nozzle 14, Figs. 1 and 5 – wherein the restriction is a cone as it is a progressive reduction in diameter of a cylinder; "heater 22 is disposed over the whole peripheral region of the heating cylinder 12. A heater 24 is also disposed in a portion of the heating cylinder 12 near the injection nozzle 14", column 3, lines 55-58)

e. the cone melting the exterior of the rod and forming a molten glass seal at the inlet ("It is thus possible to establish the state where the tip portion (near the injection nozzle 14) of the glass rod 18 has a low viscosity", column 3, lines 61-63; "glass rod 18 is heated and melted by the heaters 20, 22, 24", column 4, lines 57-58 – wherein the molten glass being pressed by glass rod pressing device 16

is considered to form a molten glass seal at the heated cone and the injection nozzle).

14. Regarding claim 66, Sasaki '746 further teaches the rod (glass rod 18, Figs. and 5) is substantially horizontal as it enters the melting chamber and the shape (glass filled in cavity 32, Figs. 1 and 5) is substantially horizontal as it exits the melting chamber. Examiner additionally notes that some axis of the rod and some axis of the shape will always be horizontal, as no reference axis has been established.

15. Claims 27-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Dietzsch '909 (US Patent No. 4,078,909).

16. Regarding claim 27, Dietzsch '909 teaches a heated chamber (melting chamber 2, feed-in chamber 15, and spinning nozzle 16, Fig. 1; "Heating of the apparatus is effected by means of IR emitters 35 which are so arranged around the melting chamber, the feed-in chamber, the spinning nozzle 16", column 9, lines 35-37) having:

a. an outlet (nozzle opening 21, Fig. 1)

b. a die in the outlet (free end 25 of the displacement body 22, Fig. 1)

c. a hollow inner forming tube extending from the vicinity of the outlet, within an inside dimension of the die (through-hole 31, Fig. 1), through a gland in the wall of the chamber (conically tapering contact zone 24, Fig. 1)

d. the inner forming tube being connected to a source of pressure of vacuum (filling gas source 29, Fig. 1; column 9, lines 8-23)

e. the pressure or vacuum being controllable to affect at least one dimension of the shape ("The tube 4'' being pressed through the spinning aperture 26 is filled by the filling gas F and maintained in a stable shape", column 9, lines 26-29).

17. Regarding claim 28, Dietzsch '909 further teaches an adjustment device (filling gas source 29, Fig. 1) operatively attached to a part of the hollow inner forming tube outside the chamber (column 9, lines 8-23 – wherein the filling gas source alters and regulates, or adjusts, the shape of the tube 4'', and is thus an adjustment device).

18. Regarding claim 29, Dietzsch '909 further teaches the inner forming tube is straight (through-hole 31, Fig. 1), the apparatus further comprising an inlet passage having an axis parallel to the inner forming tube and offset from the inner forming tube (tube 10, Fig. 1).

19. Regarding claim 30, the claim recites only intended use of the apparatus, rather than structural limitations of the apparatus itself. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987). Additionally, "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969), and "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d *>996<, 25 USPQ 69

(CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

20. Claims 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Bogdahn '428 (US Patent No. 6,098,428).

21. Regarding claim 37, Bogdahn '428 teaches:

a. a solid rod (solid cylindrical preform 27, Fig. 2) of heat-softenable material ("producing an elongated component of glass by drawing from a blank, in which the blank is sent to a heating zone, where it is softened", column 1, lines 6-8) is fed through a heated restriction (furnace 3, deformation zone 4, drawing bulb 5, Fig. 2; "tube 6 can be pulled off from it by means of a take-off device 7 as a drawing bulb is formed", column 10, lines 4-6 – wherein the take-off device 7 in Fig. 1 is equivalent to that in Fig. 2, see column 14, lines 7-10)

b. determining changes in temperature at the restriction ("The temperature of drawing bulb 5 is measured by means of a second pyrometer 14", column 14, lines 19-20; Fig. 2)

c. controlling the rate of feeding the rod in response to changes in temperature at the restriction ("The following parameters are fed to central process control unit 20:…the temperature of drawing bulb 5, measure by second pyrometer 14. Process control unit 20 drives…controller 21 of take-off unit 7", column 14, lines 35-43; "The fiber take-off rate is...adjusted by way of a speed controller 21", column 14, lines 26-28 – wherein a change in the

d. the restriction is the inlet (area of furnace 3 level with and above second pyrometer, Fig. 2) of a melting chamber (furnace 3, Fig. 2).

22. Regarding claim 38, Bogdahn '428 further teaches the melting chamber (furnace 3, Fig. 2) includes and outlet (area of furnace 3 below the level of second pyrometer, Fig. 2), the material (preform 27, Fig. 2) forming a draw down at the outlet (drawing bulb 5, Fig. 2).

23. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

24. Claims 31 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Schmitt '442 (US Patent No. 6,938,442 B1).

25. Regarding claim 31, Schmitt '442 teaches:

a. a plurality of feed drives (drawing carriages 8a, 8b, 8c, Fig. 1)

b. at least one of the feed drives being biased into engagement with the rod ("Each of the drawing carriages…is provided with a holding chuck 9…holding chucks 9 grip the surface of the tube 6", column 6, lines 25-26 and 36-37)

c. a sensor for detecting rod section ends (diameter measuring device 13, Fig. 1 – wherein rod sections may be defined by the very top or bottom of hollow

cylinder 1 where the sensor would sense the absence of the rod as a diameter of zero, as well as rod sections of varying diameter, i.e., the rod section of narrow diameter and the rod section of larger diameter, wherein the diameter measuring device determines where such a section starts or ends, defined by its diameter)

d. a mechanism for varying the bias of the at least one feed drive in response to the sensor ("control means", column 7, line 6; "diameter...is continuously measured by means of a diameter-measuring device 13 and the measurement data are supplied to a control means. The regulated variable of the control means is the drawing rate", column 7, lines 4-7).

The final phrase, "to protect the rod ends", recites only intended use of the apparatus, rather than structural limitations of the apparatus itself. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987). Additionally, "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim."

26. Regarding claim 32, the claim recites only intended use of the apparatus (arrangement of the rods), rather than structural limitations of the apparatus itself. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex*

parte Masham, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987). Additionally, "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969), and "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d *>996<, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)). It is considered that rod ends may be arranged abuttingly with the apparatus of Schmitt '442 (see, for example, hollow cylinder 1 and dummy cylinder 10, Fig. 1).

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

28. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

29. Claims 11 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietzsch '909 (US Patent No. 4,078,909) in view of Sasaki '746 (US Patent No. 5,540,746).

30. Regarding claim 11, Dietzsch '909 teaches:

a. providing a heating chamber (housing 37, melting chamber 2, feed-in chamber 15, spinning nozzle 16, Fig. 1), the heating chamber having:

i. a single inlet (tube 10, melting chamber 2, feed-in chamber 15, feeding means 19, distribution means 18, Fig. 1)

ii. a single outlet (nozzle opening 21, Fig. 1)

iii. a hollow inner forming tube extending from the vicinity of the outlet, within an inside dimension of the outlet (through-hole 31, Fig. 1), through a gland in a wall of the chamber (conically tapering contact zone 24, Fig. 1)

b. pushing glass into the inlet ("inorganic meltable materials such as glass", column 1, lines 7-8; "pellets 4 of the material can fall into the melting chamber", column 8, lines 14-15; "melted material 4' fills the melting chamber 2", column 8, lines 20-21; "molten material 4' in the melting chamber 2 always reaches the same level and thus exerts and approximately constant hydrostatic pressure on the spinning nozzle 16 connected via a feed-in chamber 15 to the melting chamber 2", column 8, lines 26-30)

c. pulling a tube (4'', Fig. 1) from the outlet ("tube 4'' is drawn off by the drawing device 33", column 10, lines 8-9; "Underneath the spinning nozzle 16 a

drawing off device 33 is attached…turning in the direction of the arrow 34 which winds up the finished thread-like capillaries 4'''.", column 9, lines 30-34). Dietzsch '909 varies from the claimed invention by its means of feeding glass, as it is silent regarding a solid glass rod and the inlet comprising a heated cone.

In analogous art of glass processing, Sasaki '746 teaches an alternative method and structure for feeding glass by pushing a solid glass rod (glass rod 18, Figs. 1 and 5) into an inlet (inlet 26 and heating cylinder 12, up to injection nozzle 14, Figs. 1 and 5; "glass rod 18 is inserted into the heating cylinder 12 and pressed by the glass rod pressing device 16", column 3, lines 43-45), wherein the inlet comprises a heated cone having a diameter less than the diameter of the solid glass rod (see cone at end of heating cylinder 12 near injection nozzle 14, Figs. 1 and 5 – wherein the restriction is a cone as it is a progressive reduction in diameter of a cylinder; "heater 22 is disposed over the whole peripheral region of the heating cylinder 12. A heater 24 is also disposed in a portion of the heating cylinder 12 near the injection nozzle 14", column 3, lines 55-58), the cone melting the exterior of the rod and forming a molten glass seal at the inlet ("It is thus possible to establish the state where the tip portion (near the injection nozzle 14) of the glass rod 18 has a low viscosity", column 3, lines 61-63; "glass rod 18 is heated and melted by the heaters 20, 22, 24", column 4, lines 57-58 – wherein the molten glass being pressed by glass rod pressing device 16 is considered to form a molten glass seal at the heated cone and the injection nozzle) for the benefit of creating a pressure (force per unit area) on the molten glass by a reduction in diameter such that the glass is re-formed as it is forced through the cone and eventually

through the outlet (injection nozzle 14, Figs. 1 and 5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Dietzsch ‘909 by substituting the feeding means for the feeding means of Sasaki ’746 for the benefit of creating a pressure on the molten glass by a reduction in diameter such that the glass is re-formed as it is forced through the cone and eventually through the outlet.

31. Regarding claim 64, Dietzsch ‘909 and Sasaki '746 teach rod, tube, and melting chamber (heating chamber) as described for claim 11 above. Dietzsch ‘909 teaches the tube is substantially horizontal as it exits the melting chamber (tube 4’’ and capillaries 4’’’, Fig. 1 – wherein cross-sectional axes of the tube are in a horizontal plane immediately after exiting the chamber, and longitudinal axes are in a horizontal plane at the upper and lower tangents of drawing off device 33). Dietzsch '909 is silent regarding the rod. Sasaki '746 teaches the rod is substantially horizontal along its longitudinal axis as it enters the melting chamber (Figs. 1 and 5), and further that the longitudinal axis of the rod may be aligned in a number of ways (see Figs. 1-5; “Since the nozzle body 42 is put into close contact with the forming mold 30, glass can be supplied not only downwardly but also transversely or upwardly”, column 7, lines 8-10) for the benefit of manipulating temperature gradients and deformation of the rod as it is heated in the chamber (“Cooling gas is supplied to the cooling gas inlet 88, sent to the cooling gas outlet 90 through the groove 86…the cooling gas cools the glass rod 18 and suppresses deformation of the intermediate portion thereof”, column 10, lines 31-36 – whereby the orientation may affect the flow of the cooling gas and the effects of gravity

on the rod) and the characteristics of the glass as it exits the chamber ("A vent 66 which communicates with the outside of the forming mold 30 is formed at the upper end of the cavity 32 in order to exhaust the air in the cavity 32…Hence the glass is gradually upwardly moved in the cavity 32 thereby preventing the occurrence of defects...in the molded product", column 8, lines 5-7 and 15-17). Additionally, some axis of the rod will always be horizontal, such as a cross-sectional axis or a diagonal axis, as no reference axis has been established in the claims. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Dietzsch '909 with the rod and orientation of Sasaki '746 for the benefit of manipulating temperature gradients and deformation of the rod as it is heated in the chamber and the characteristics of the glass as it exits the chamber.

32. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki '746 (US Patent No. 5,540,746).

33. Regarding claim 14, Sasaki '746 teaches rod as described for claim 12 above, but is silent regarding variations in rod diameter. However, it is considered that it would have been within the knowledge of one of ordinary skill in the art at the time of the invention that a commercially available glass rod would have diameter tolerances within the claimed range. Manufacturing a rod with a variation in diameter less than 0.5% would require extensive process controls and would drastically increase cost of the rod, which is especially undesirable in view of the fact that the rod is only going to be subsequently melted and reformed. Manufacturing a rod with a variation in diameter

greater than 5% would be undesirable as it could cause inconsistencies in a product created from such a rod, or it could break equipment designed for a given rod diameter.

34. Regarding claim 15, Sasaki '746 teaches inlet and rod as described for claim 12 above. Sasaki '746 is silent regarding the specific diameters of the inlet and the rod. Sasaki '746 does illustrate the diameter of the inlet decreasing from approximately an equal diameter as that of the glass rod to a considerable percentage smaller than the diameter of the glass rod in the conical portion of the inlet near injection nozzle 14 (Fig. 1), such that the reduced diameter increases pressure (force per unit area) on the melted glass and re-forms it as it is eventually forced through the injection nozzle 14. It is considered that it would have been within the knowledge of one of ordinary skill in the art at the time of the invention to optimize this ratio for the benefit of creating pressure on the melted glass such that the glass is re-formed as it is forced through the cone and the injection nozzle.

35. Claims 65 and 67-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietzsch '909 (US Patent No. 4,078,909) and Sasaki '746 (US Patent No. 5,540,746) in view of Senapati '926 (US Patent No. 6,128,926).

36. Regarding claim 65, Dietzsch '909 and Sasaki '746 teach rod, feeding, and feeding the rod (pushing the rod) as described for claims 11 and 64 above. Dietzsch '909 teaches controlling the speed of feeding the glass in response to changes in the amount of material in the chamber available for forming the tube ("The rate at which the melted material 4' fills the melting chamber 2 is determined by means of a device

14a…molten material 4' in the melting chamber 2 always reaches the same level", column 8, lines 20-30). Dietzsch '909 is silent regarding a rod.

In analogous art of glass processing, Senapati '926 teaches controlling the force of pushing a rod (and thus the speed of pushing, as increased force leads to an increased rate of extrusion from the outlet, and thus an increased rate of feeding the rod into the inlet; "they system should obey the conservation of mass principle such that the incoming volumetric flow rate of glass at the die equals the exit flow rate", column 5, lines 30-32) in response to changes in diameter of the extrudant ("The diameter of the glass rod is monitored by a diameter monitoring system 24…compares the diameter of the glass rod 20 that is measured to a reference value and applied a signal to an extruding force control system 30 in order to adjust the amount of extruding force applied to the piston 18", column 5, lines 15-20; Fig. 1) for the benefit of ensuring a precision glass product. While Senapati '926 is monitoring diameter of the output extrudant rather than the input rod, given this feedback loop principle of Senapati '926 and the conservation of mass principle of Senapati '926 and Dietzsch '909, along with the feed systems of Dietzsch '909 and Sasaki '746, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Dietzsch '909 and Sasaki '746 with the diameter monitoring and feed control system of Senapati '926 to arrive at the claimed invention for the benefit of ensuring a precision glass product.

37. Regarding claim 67, Dietzsch '909 and Sasaki '746 teach the chamber and pushing a solid glass rod into the inlet as described for claim 11 above. Dietzsch '909

and Sasaki '746 are silent regarding a relationship between feeding force and formation of air bubbles or air channels.

Senapati '926 teaches pushing a glass rod (glass preform 13, extruding force 30, piston 18, Fig. 1) into an inlet (sleeve 12, Fig. 1) with sufficient force to produce a pressure in a chamber which suppresses formation of air bubbles or air channels in glass in the chamber ("When the glasses are extruded at these temperatures with a typical feed pressure of 100-500 psi, good quality rods with excellent surface finish and free of defects such as refractive index fluctuations are obtained. Another advantage of such extrusion pressures is that any internal bubbles left behind in the glass can be burst as well…The application of high pressures during the extrusion process helps eliminate such bubbles", column 4, lines 48-54 and 61-62) for the benefit of forming quality glass products free of defects. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Dietzsch '909 and Sasaki '746 with the feeding force of Senapati '926 for the benefit of forming quality glass products free of defects.

38. Regarding claim 68, Dietzsch '909 teaches:

a. providing a heating chamber (melting chamber 2, feed-in chamber 15, spinning nozzle 16, Fig. 1), the heating chamber having:

i. a single inlet (melting chamber 2, feed-in chamber 15, feeding means 19, distribution means 18, Fig. 1)

ii. a single outlet (nozzle opening 21, Fig. 1)

iii. a hollow inner forming tube extending from the vicinity of the outlet, within an inside dimension of the outlet (through-hole 31, Fig. 1), through a gland in a wall of the chamber (conically tapering contact zone 24, Fig. 1)

b. the heating chamber being filled with molten glass and being substantially free of gas (molten material 4', Fig. 1; "inorganic meltable materials such as glass", column 1, lines 7-8)

c. pushing glass into the inlet ("inorganic meltable materials such as glass", column 1, lines 7-8; "pellets 4 of the material can fall into the melting chamber", column 8, lines 14-15; "melted material 4' fills the melting chamber 2", column 8, lines 20-21; "molten material 4' in the melting chamber 2 always reaches the same level and thus exerts and approximately constant hydrostatic pressure on the spinning nozzle 16 connected via a feed-in chamber 15 to the melting chamber 2", column 8, lines 26-30)

d. pulling a horizontal tube (4'', Fig. 1) from the outlet ("tube 4'' is drawn off by the drawing device 33", column 10, lines 8-9; "Underneath the spinning nozzle 16 a drawing off device 33 is attached…turning in the direction of the arrow 34 which winds up the finished thread-like capillaries 4'''.", column 9, lines 30-34; wherein cross-sectional axes of the tube and capillary are in a horizontal plane immediately after exiting the chamber, and longitudinal axes are in a horizontal plane at the upper and lower tangents of drawing off device 33)

Dietzsch '909 varies from the claimed invention by its means of feeding glass, as it is silent regarding a solid glass rod and the inlet comprising a heated cone.

In analogous art of glass processing, Sasaki '746 teaches an alternative method and structure for feeding glass by pushing a horizontal solid glass rod (glass rod 18, Figs. 1 and 5) into an inlet (inlet 26 and heating cylinder 12, up to injection nozzle 14, Figs. 1 and 5; "glass rod 18 is inserted into the heating cylinder 12 and pressed by the glass rod pressing device 16", column 3, lines 43-45), wherein the inlet comprises a heated cone having a diameter less than the diameter of the solid glass rod (see cone at end of heating cylinder 12 near injection nozzle 14, Figs. 1 and 5 – wherein the restriction is a cone as it is a progressive reduction in diameter of a cylinder; "heater 22 is disposed over the whole peripheral region of the heating cylinder 12. A heater 24 is also disposed in a portion of the heating cylinder 12 near the injection nozzle 14", column 3, lines 55-58), the cone melting the exterior of the rod and forming a molten glass seal at the inlet ("It is thus possible to establish the state where the tip portion (near the injection nozzle 14) of the glass rod 18 has a low viscosity", column 3, lines 61-63; "glass rod 18 is heated and melted by the heaters 20, 22, 24", column 4, lines 57-58 – wherein the molten glass being pressed by glass rod pressing device 16 is considered to form a molten glass seal at the heated cone and the injection nozzle) for the benefit of creating a pressure (force per unit area) on the molten glass by a reduction in diameter such that the glass is re-formed as it is forced through the cone and eventually through the outlet (injection nozzle 14, Figs. 1 and 5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Dietzsch '909 by substituting the feeding means for the feeding means of Sasaki '746 for the benefit of creating a pressure on the molten glass by a reduction in

diameter such that the glass is re-formed as it is forced through the cone and eventually through the outlet.

Dietzsch ‘909 and Sasaki ‘746 are silent regarding a relationship between feeding force and formation of air bubbles or air channels.

In analogous art of glass manufacturing, Senapati '926 teaches pushing a glass rod (glass preform 13, extruding force 30, piston 18, Fig. 1) into an inlet (sleeve 12, Fig. 1) with sufficient force to produce a pressure in a chamber which suppresses formation of air bubbles or air channels in glass in the chamber (“When the glasses are extruded at these temperatures with a typical feed pressure of 100-500 psi, good quality rods with excellent surface finish and free of defects such as refractive index fluctuations are obtained. Another advantage of such extrusion pressures is that any internal bubbles left behind in the glass can be burst as well…The application of high pressures during the extrusion process helps eliminate such bubbles”, column 4, lines 48-54 and 61-62) for the benefit of forming quality glass products free of defects. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Dietzsch ‘909 and Sasaki ‘746 with the feeding force of Senapati ‘926 for the benefit of forming quality glass products free of defects.

39. Regarding claim 69, Dietzsch '909, Sasaki '746, and Senapati '926 teach feeding a solid glass rod as described for claim 68 above. Senapati '926 teaches feed pressure (column 4, lines 49-5), but is silent regarding a cross-sectional area of preform 13 for conversion to units of pressure to force that would enable a direction comparison to the claimed range of force. However, Senapati ‘926 teaches that feed pressure (and thus

the force) is a result effective variable because it may be altered in order to suppress bubbles in the melt for given processing conditions, thereby enabling formation of quality glass products free of defects ("When the glasses are extruded at these temperatures with a typical feed pressure of 100-500 psi, good quality rods with excellent surface finish and free of defects such as refractive index fluctuations are obtained. Another advantage of such extrusion pressures is that any internal bubbles left behind in the glass can be burst as well…The application of high pressures during the extrusion process helps eliminate such bubbles", column 4, lines 48-54 and 61-62). It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Dietzsch '909, Sasaki '746, and Senapati '926 by optimizing the force at which the glass is fed for the benefit of suppressing bubbles in the melt for given processing conditions, thereby enabling formation of quality glass products free of defects.

Response to Arguments

40. Examiner acknowledges the amendment to claim 38 correcting its dependency. The objection of the previous office action is withdrawn.

41. Applicant's arguments filed 05-11-2009 have been fully considered but they are not persuasive. Arguments are summarized as follows:

a. Schmitt '442 does not disclose an apparatus for feeding glass rod sections, as Schmitt is concerned with pulling a continuous glass tube draw-down.

b. Schmitt '442 does not suggest a mechanism for varying the bias of at least one feed drive in response to the sensor to protect the rod ends.

Response:

a. Glass rod sections may be defined in a number of ways, including as discrete pieces of glass, or as sections of differing properties such as composition, geometry, or temperature. In the above rejection for claim 31, Examiner has defined glass rod sections by their geometry, namely diameter. Additionally, claim 31 is directed to an apparatus, and intended use of the apparatus (pulling continuous glass tube or feeding glass rod sections) "does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

b. Examiner holds that Schmitt '442 teaches the disputed elements of claim 31. For specific mapping of the reference, see the above rejection for claim 31. Additionally, see the objection to the specification above. Examiner emphasizes that the phrase "to protect the rod ends" is a recitation of intended use, and does not impart patentability to the apparatus claimed. See *Ex parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987), as above.

42. Applicant's arguments with respect to all remaining claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin Snelting whose telephone number is (571)272-7169. The examiner can normally be reached on Monday to Friday 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571)272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

els

/Eric Hug/
Primary Examiner, Art Unit 1791